Rheological characterisation of Malaysian varieties of sweet potato doughs using large and small deformation measurements

ABSTRACT

The rheological properties of sweet potato doughs at different mixing times were studied. In the large deformation extension test, extensibility parameters including dough length at fracture, measured, and actual forces acting on dough strips were obtained for calculating the stress-strain data. For the small deformation test, both storage and loss modulus of dough were studied. The extensibility of dough from sweet potato flour increased to its peak at five minutes mixing time before decreasing illustrating an optimum mixing time. The variety of VitAto which has a higher protein content of 5.7 g/100 g has higher values of all the extensibility parameters as compared to Bukit Naga and Okinawan. In terms of flow-behavior index, all sweet potato doughs displayed n values from 1.82 to 2.11, indicating strain hardening behaviors similar to wheat flour doughs. The small deformation tests were not able to identify the optimum mixing time, although in general, illustrated that sweet potato doughs were essentially elastic or recoverable. The Pearson correlations of large and small deformation tests showed that the rheological parameters were positively correlated among themselves in the evaluation of the effect of mixing time to rheological properties of sweet potato dough.

Keyword: Sweet potato; Flour; Extensibility; Viscoelastic; Vitato